

CLAIMS:

1. A hitch assembly comprising:

a hitch bar assembly coupled with a hitch receiver of a tow vehicle for transferring pulling and stopping forces to and from the tow vehicle;

a hitch box assembly coupled with the hitch bar assembly for transferring pulling and stopping forces to and from the hitch bar assembly, the hitch box assembly having a first pivot point;

an overcenter latch assembly securing the hitch box assembly to the hitch bar assembly;

a front support member pivotally connected to the hitch box assembly at the first pivot point for transferring pulling and stopping forces to and from the hitch box assembly and for pivoting during turns;

a strut assembly pivotally connected to the front support member for transferring pulling and stopping forces to and from the front support member and the strut assembly includes a second pivot point;

a ball mount assembly pivotally connected to the strut assembly at the second pivot point for transferring pulling and stopping forces to and from the strut assembly, wherein the ball mount assembly laterally pivots about the second pivot point within the strut assembly during turns, the ball mount assembly including a tail tube extending rearwardly;

a ball plate assembly attached to the ball mount assembly for transferring pulling and stopping forces to and from the ball mount assembly which includes a hitch ball for

removable attachment of the trailer for transferring pulling and stopping forces to and from the trailer;

a tail support assembly attached to a trailer frame and coupled with the tail tube whereby the tail support assembly restricts lateral movement of the tail tube and ball mount assembly so the trailer remains relative to the ball mount assembly at all times;

a slide assembly residing within the ball mount assembly such that forces inherent in towing the trailer are not transferred through the slide assembly whereby the slide assembly slides forwards and backwards to accommodate the change in radial movement of the converging links during turns;

converging links pivotally connected between the hitch box assembly at the first pivot point and the slide assembly whereby the angular position between the first pivot point and slide assembly can be varied, the converging links effectively moving the pivot point between the tow vehicle and trailer forward of the hitch assembly, wherein forces inherent in towing the trailer are not transferred through the converging links;

a hanging support assembly attached to the strut assembly including at least one vertical link pivotally attached to the ball mount assembly for transferring tongue weight from the ball mount assembly through the strut assembly and front support member to the hitch box assembly and hitch bar assembly so tongue weight is not exerted on the converging links or the slide assembly;

a jack assembly attached between the trailer frame and the front support member for distributing tongue weight among tow vehicle wheels and trailer wheels.

2. The hitch assembly of claim 1, wherein the hitch bar assembly comprises:

a square bar for inserting into the hitch receiver;

overcenter latch tabs attached to the midsection of each side of the bar defining recesses for coupling with the overcenter latch assembly; and

at least one stop attached to the rear of the tabs on the bar for coupling with the hitch box assembly.

3. The hitch assembly of claim 1, wherein the hitch box assembly comprises:

an outer hitch box defining an opening, front tabs for attaching to the overcenter latch assembly, and back tabs for pivotally attaching the converging links;

an inner hitch box attached within the opening of the outer hitch box including angular walls for seating with the hitch bar assembly; and

at least one king pin for pivotally connecting to the front support member at the first pivot point.

4. The hitch assembly of claim 1, wherein the overcenter latch assembly comprises a pair of latches pivotally attached to the hitch box assembly, each latch including a pair of connecting links attached in parallel with vertical tubes attaching to an end of connecting links, pivot pins pivotally attached to an end of the connecting links opposite the vertical tubes defining transversely threaded bores wherein the pivot pins can rotate about a vertical axis, thrust links inserted into the threaded bores of the pivot pins for engaging the hitch bar assembly wherein the thrust links can be adjusted to insure a tight fit.

5. The hitch assembly of claim 1, wherein the front support member comprises:

an upper crossbar for pivotally connecting to the hitch box assembly at the first pivot point;

a lower crossbar for pivotally connecting to the hitch box assembly at the first pivot point;

side caps connecting the ends of the upper crossbar and the lower crossbar;

spring bar tubes attached to each bottom end of the lower crossbar extending at an outward angle for coupling with the jack assembly; and

side support plates connecting the spring bar tube to the side caps so the upper crossbar and the lower crossbar are parallel.

6. The hitch assembly of claim 1, wherein the strut assembly comprises:

side tubes pivotally attached to the front support member so the side tubes may pivot vertically but are rigid laterally to accommodate uneven roads during driving;

rear caps attached between rear ends of the side tubes completing an arch-shaped frame; and

a ball mount pin attached at the second pivot point for pivotally attaching the ball mount assembly.

7. The hitch assembly of claim 1, wherein the ball mount assembly comprises:

a pair of c-shaped side channels extending rearwardly and horizontally parallel with each other so each opening faces inward for receiving the slide assembly and a rear portion of the side channels angling inward and connecting to form a V-shape for attaching to the strut assembly at the second pivot point; and

vertical supports attached to front ends of the side channels for attaching the ball plate assembly at multiple heights.

8. The hitch assembly of claim 1, wherein the ball plate assembly comprises:
a crossbar;

side supports attached to each end of the crossbar, wherein the hitch ball attaches to the midsection of the crossbar for removable attachment of the trailer for transferring pulling and stopping forces to and from the trailer.

9. The hitch assembly of claim 1, wherein the tail support assembly comprises:

u-bolt plates attached to the trailer frame including an angled channel tab extending laterally inward;

a channel attached between the u-bolt plates so the channel can be adjusted laterally;

a tail bracket attached to an underside of the channel for restricting lateral movement of the tail tube and ball mount assembly so the trailer remains relative to the ball mount assembly at all times; and

a roller attached to the tail bracket for supporting the tail tube and allowing movement of the tail tube along a longitudinal axis of the trailer to accommodate movement resulting from the use of surge brakes.

10. The hitch assembly of claim 1, wherein the slide assembly comprises:
guides attaching to the ball mount assembly to act as bearing surfaces;

a pair of slide plates attached in parallel with spacers, the slide plates including front ends for pivotally attaching to the converging links whereby the slide plates slide back and forth along the guides;

crosslink brackets attached to the ball mount assembly; and

crosslinks pivotally attached between the slide plates and the crosslink brackets to limit the back and forth motion of the slide plates.

11. The hitch assembly of claim 1, wherein the hanging support assembly comprises:

a support frame attached to the strut assembly including a pair of legs connected by a crossbar;

at least one vertical link pivotally connected between the crossbar and the ball mount assembly.

12. The hitch assembly of claim 1, wherein the jack assembly comprises:

jack brackets attached to the trailer frame;

jacks attached to the jack brackets;

spring bars attached to the front support member and pivotally attached to the jacks whereby the jacks can be adjusted to appropriately tension the spring bars for proper weight distribution.

13. A hitch assembly comprising:

a hitch bar assembly coupled with a hitch receiver of a tow vehicle for transferring pulling and stopping forces to and from the tow vehicle, the hitch bar including a square bar for inserting into the hitch receiver, overcenter latch tabs

attached to the midsection of each side of the bar defining recesses, and at least one stop attached to the rear of the tabs on the bar;

a hitch box assembly coupled with the hitch bar assembly for transferring pulling and stopping forces to and from the hitch bar assembly, the hitch box assembly having a first pivot point, the hitch box assembly including an outer hitch box defining an opening, front tabs, and back tabs, an inner hitch box attached within the opening of the outer hitch box including angular walls for seating with the stop of the hitch bar assembly, and at least one king pin attached at the first pivot point;

an overcenter latch assembly securing the hitch box assembly to the hitch bar assembly, the overcenter latch assembly including a pair of latches pivotally attached to the front tabs of the hitch box assembly, each latch including a pair of connecting links attached in parallel with vertical tubes attaching to an end of connecting links, pivot pins pivotally attached to an end of the connecting links opposite the vertical tubes defining transversely threaded bores wherein the pivot pins can rotate about a vertical axis, and thrust links inserted into the threaded bores of the pivot pins for engaging the recesses of the latch tabs of the hitch bar assembly wherein the thrust links can be adjusted to insure a tight fit;

a front support member pivotally connected to the hitch box assembly at the first pivot point for transferring pulling and stopping forces to and from the hitch box assembly and for pivoting during turns, the front support member including an upper crossbar for pivotally connecting to the king pin of the hitch box assembly at the first pivot point, a lower crossbar for pivotally connecting to the king pin of the hitch box

assembly at the first pivot point, side caps connecting the ends of the upper crossbar and the lower crossbar, spring bar tubes attached to each bottom end of the lower crossbar extending at an outward angle; and side support plates connecting the spring bar tube to the side caps so the upper crossbar and the lower crossbar are parallel;

a strut assembly pivotally connected to the front support member for transferring pulling and stopping forces to and from the front support member and the strut assembly includes a second pivot point, the strut assembly including side tubes pivotally attached to the front support member so the side tubes may pivot vertically but are rigid laterally to accommodate uneven roads during driving, rear caps attached between rear ends of the side tubes completing an arch-shaped frame, and ball mount pin attached at the second pivot point;

a ball mount assembly pivotally connected to the strut assembly at the second pivot point for transferring pulling and stopping forces to and from the strut assembly, wherein the ball mount assembly laterally pivots about the second pivot point within the strut assembly during turns, the ball mount assembly including a tail tube extending rearwardly, the ball mount including a pair of c-shaped side channels extending rearwardly and horizontally parallel with each other so each opening faces inward for receiving the slide assembly and a rear portion of the side channels angling inward and connecting to form a V-shape for attaching to the ball mount pin of the strut assembly at the second pivot point, and vertical supports attached to front ends of the side channels;

a ball plate assembly attached to the ball mount assembly for transferring pulling and stopping forces to and from the ball mount assembly, wherein the ball plate may attach at multiple height, the ball plate assembly including a crossbar, side supports attached to each end of the crossbar, and a hitch ball attaches to the midsection of the crossbar for removable attachment of the trailer for transferring pulling and stopping forces to and from the trailer;

a tail support assembly attached to a trailer frame and coupled with the tail tube whereby the tail support assembly restricts lateral movement of the tail tube and ball mount assembly so the trailer remains relative to the ball mount assembly at all times, the tail support assembly including u-bolt plates attached to the trailer frame including an angled channel tab extending laterally inward, a channel attached between the u-bolt plates so the channel can be adjusted laterally, tail bracket attached to an underside of the channel for restricting lateral movement of the tail tube and ball mount assembly, and a roller attached to the tail bracket for supporting the tail tube and allowing movement of the tail tube along a longitudinal axis of the trailer to accommodate movement resulting from the use of surge brakes;

a slide assembly residing within the ball mount assembly such that forces inherent in towing the trailer are not transferred through the slide assembly whereby the slide assembly slides forwards and backwards to accommodate the change in radial movement of the converging links during turns, the slide assembly including guides attaching to the side channels of the ball mount assembly to act as bearing surfaces, a pair of slide plates attached in parallel with spacers, the slide plates

including front ends for pivotally attaching to the converging links whereby the slide plates slide back and forth along the guides, crosslink brackets attached to the side channels of the ball mount assembly, and crosslinks pivotally attached between the slide plates and the crosslink brackets to limit the back and forth motion of the slide plates;

converging links pivotally connected between the hitch box assembly at the first pivot point and the slide assembly whereby the angular position between the first pivot point and slide assembly can be varied, the converging links effectively moving the pivot point between the tow vehicle and trailer forward of the hitch assembly, wherein forces inherent in towing the trailer are not transferred through the converging links;

a hanging support assembly attached to the strut assembly including at least one vertical link pivotally attached to the ball mount assembly for transferring tongue weight from the ball mount assembly through the strut assembly and front support member to the hitch box assembly and hitch bar assembly so tongue weight is not exerted on the converging links or the slide assembly, the hanging support assembly including a support frame attached to the side tubes of the strut assembly including a pair of legs connected by a crossbar, and at least one vertical link pivotally connected between the crossbar and the side channels of the ball mount assembly; and

a jack assembly attached between the trailer frame and the front support member for distributing tongue weight among tow vehicle wheels and trailer wheels, the jack assembly including jack brackets attached to side members of the trailer frame, jacks attached to the jack brackets, and spring bars attached to the spring bar tubes of

the front support member and pivotally attached to the jacks whereby the jacks can be adjusted to appropriately tension the spring bars for proper weight distribution.

14. A hitch assembly comprising:

a hitch bar assembly coupled with a hitch receiver of a tow vehicle for transferring pulling and stopping forces to and from the tow vehicle;

a hitch box assembly coupled with the hitch bar assembly for transferring pulling and stopping forces to and from the hitch bar assembly, the hitch box assembly having a first pivot point;

an overcenter latch assembly securing the hitch box assembly to the hitch bar assembly;

a front support member pivotally connected to the hitch box assembly at the first pivot point for transferring pulling and stopping forces to and from the hitch box assembly and for pivoting during turns;

a strut assembly pivotally connected to the front support member for transferring pulling and stopping forces to and from the front support member and the strut assembly includes a second pivot point;

a ball mount assembly pivotally connected to the strut assembly at the second pivot point for transferring pulling and stopping forces to and from the strut assembly, wherein the ball mount assembly laterally pivots about the second pivot point within the strut assembly during turns, the ball mount assembly including a tail tube extending rearwardly;

a ball plate assembly attached to the ball mount assembly for transferring pulling and stopping forces to and from the ball mount assembly which includes a hitch ball for removable attachment of the trailer for transferring pulling and stopping forces to and from the trailer;

a tail support assembly attached to a trailer frame and coupled with the tail tube whereby the tail support assembly restricts lateral movement of the tail tube and ball mount assembly so the trailer remains relative to the ball mount assembly at all times;

converging links pivotally connected between the hitch box assembly at the first pivot point and the slide assembly whereby the angular position between the first pivot point and slide assembly can be varied, the converging links effectively moving the pivot point between the tow vehicle and trailer forward of the hitch assembly, wherein forces inherent in towing the trailer are not transferred through the converging links;

a roller assembly attached to a front of the ball mount assembly for transferring tongue weight from the ball mount assembly through the roller assembly and front support member to the hitch box assembly and hitch bar assembly so tongue weight is not exerted on the converging links or the slide assembly, the roller assembly including a C-channel attached to a front of the strut assembly, rollers attached to the ball mount assembly so they engage the C-channel whereby the rollers roll back and forth within the C-channel; and

a jack assembly attached between the trailer frame and the front support member for distributing tongue weight among tow vehicle wheels and trailer wheels.

15. A hitch assembly comprising:

a hitch bar assembly coupled with a hitch receiver of a tow vehicle for transferring pulling and stopping forces to and from the tow vehicle;

a hitch box assembly coupled with the hitch bar assembly for transferring pulling and stopping forces to and from the hitch bar assembly, the hitch box assembly having a first pivot point;

an overcenter latch assembly securing the hitch box assembly to the hitch bar assembly;

a front support member pivotally connected to the hitch box assembly at the first pivot point for transferring pulling and stopping forces to and from the hitch box assembly and for pivoting during turns;

a strut assembly pivotally connected to the front support member for transferring pulling and stopping forces to and from the front support member and the strut assembly includes a second pivot point;

a ball mount assembly pivotally connected to the strut assembly at the second pivot point for transferring pulling and stopping forces to and from the strut assembly, wherein the ball mount assembly laterally pivots about the second pivot point within the strut assembly during turns, the ball mount assembly including a tail tube extending rearwardly;

a ball plate assembly attached to the ball mount assembly for transferring pulling and stopping forces to and from the ball mount assembly which includes a hitch ball for removable attachment of the trailer for transferring pulling and stopping forces to and from the trailer;

a tail support assembly attached to a trailer frame and coupled with the tail tube whereby the tail support assembly restricts lateral movement of the tail tube and ball mount assembly so the trailer remains relative to the ball mount assembly at all times;

a slide assembly residing within the ball mount assembly such that forces inherent in towing the trailer are not transferred through the slide assembly whereby the slide assembly slides forwards and backwards to accommodate the change in radial movement of the converging links during turns;

converging links pivotally connected between the hitch box assembly at the first pivot point and the slide assembly whereby the angular position between the first pivot point and slide assembly can be varied, the converging links effectively moving the pivot point between the tow vehicle and trailer forward of the hitch assembly, wherein forces inherent in towing the trailer are not transferred through the converging links;

a hanging support assembly attached to the strut assembly including at least one vertical link pivotally attached to the ball mount assembly for transferring tongue weight from the ball mount assembly through the strut assembly and front support member to the hitch box assembly and hitch bar assembly so tongue weight is not exerted on the converging links or the slide assembly;

an air bellows assembly attached between the trailer frame and the front support member for distributing tongue weight among tow vehicle wheels and trailer wheels, the air bellows assembly including a bellows bracket pivotally attached to the front support member, a shock absorber pivotally attached to the trailer frame, and a spring bar

attached between the bellows bracket and shock absorber so that the spring bars rest on adjustable air bellows.